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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,991	10/22/2001	Clark E. Lubbers	P01-3904	8686

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FORT COLLINS, CO 80527-2400

EXAMINER
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VITAL, PIERRE M

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/053,991

Applicant(s)

LUBBERS ET AL.

Examiner

Pierre M. Vital

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 3/8/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-18 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to applicant's communication filed March 8, 2005 in response to PTO Office Action dated February 15, 2005. The Applicant's remarks and amendments to the claims and/or the specification were considered with the results that follow.
2. In response to the last Office Action, no claims have been amended. No claims have been canceled. Claims 12-18 have been previously added. As a result, claims 1-18 are now pending in this application.

### ***Response to Arguments***

3. Applicant's arguments, see Remarks, page 7, filed March 8, 2005, with respect to claim 6 have been fully considered and are persuasive. The rejection of claim 6 has been withdrawn.
4. Applicant's arguments, see Remarks, page 8, filed March 8, 2005, with respect to the rejection(s) of claim(s) 12 under 35 USC 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of DeKoning et al (US6,085,333) and Todorov et al (Storage Networks on IP Infrastructure).

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5. Applicant's arguments filed March 8, 2005 have been fully considered but they are not persuasive. As to the remarks, applicant asserted that:

(a) The cited text of the '333 patent pertains only to memory address assignment; it is utterly silent regarding "the *allocation* of memory blocks".

Examiner respectfully traverses applicant's arguments for the following reasons. Applicant's argument that DeKoning pertains "only to memory address assignment" is clearly erroneous. It is to be noted that "an address" is defined in the Microsoft Press Computer Dictionary, Third Edition, as "a reference to a particular storage location". Examiner would like to point out that DeKoning discloses a spare controller allocating space within its RPA memory (i.e., *memory blocks*) for a native controller as detailed in column 9, lines 7-19. Note that RPA memory 113.2 is reserved within the cache memory 116.2 (see column 10, lines 15-16) and that the cache area in caches 116.1 and 116.2 is assigned the same corresponding addresses (see col. 8, lines 7-9). Dekoning further discloses that cache 116.1 is partitioned into a secondary area assigned for RDAC 118.1 for use in mirroring data stored in RDAC 118.2 (col. 7, lines 63-65). Thus, it can be clearly seen that a portion of cache 116.1 corresponding to a section of cache 116.2 is assigned for mirroring data between the two caches and the memory addresses are references to corresponding allocated memory blocks within caches 116.1 and 116.2 or RPA memories 113.1 and 113.2.

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(b) The cited text of the '339 patent pertains only to data mirroring; it is utterly silent regarding "the transmitting data to a corresponding block of cache data in a mirror NSC".

Examiner respectfully traverses applicant's arguments for the following reasons. Examiner would like to point out that McKean discloses that the controllers 206 and 208 are configured with cache memory 214 and 218, each having a mirror area 218, 224 as detailed in column 12, lines 10-13 and Fig. 2. Thus, it can be clearly seen that data McKean discloses that data is transmitted between corresponding blocks of mirror area 218, 224 of caches 214, 218.

(c) The cited text neither discloses nor suggests transmitting command-response data between a first NSC and a second NSC in a named resource, as recited in claim 3. Therefore, the '333 patent cannot anticipate claim 3.

Examiner respectfully traverses applicant's arguments for the following reasons. Dekoning discloses that RDAC communicates with each other and are interconnected via shared bus 156 and comprises cache memory 116 (see col. 6, lines 54-59). It can be clearly seen that the controllers (i.e., RDAC) transmit command response data via shared bus 156 and cache memory 116.

(d) As per claims 13 and 15, the cited text discloses identifying which buffer data is to be received in since DeKoning discloses freeing the buffers once mirroring is complete.

(e) The cited text of the '706 fails even to suggest "transferring context information".

Examiner respectfully traverses applicant's arguments for the following reasons. Examiner would like to point out that Ofek discloses the storage of metadata in column 23, lines 12-25. Thus, the term "context" as interpreted by the examiner is equivalent to metadata. As such, it can be clearly seen that Ofek discloses "the transfer of context information".

### ***Claim Objections***

6. Claims 1 and 7 are objected to because of the following informalities:

The first occurrence of all acronyms should be defined to enable complete illustration and understanding of the claimed invention. As such, the acronyms "NSC" and "FCAL" should be defined in claims 1 and 7, where they first occurred. Although applicant may be his own lexicographer, acronyms such as "NSC" are not well known in the art and must be defined in their first occurrence to permit a better understanding of the claims.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5 and 13-16 are rejected under 35 U.S.C. 102(b) as being anticipated by DeKoning et al (US6,085,333).

As per claim 1, DeKoning discloses a data storage system, comprising: a first NSC including a processor and associated non-volatile memory divided into a primary memory segment and a mirror memory segment [*RDAC 118.1 includes CPU 112.1, local memory 116.1; half of disk drives 110 are used to store and retrieve data while the other half mirror the data storage contents of the first half*, col. 5, lines 14-64; *memory 116.1 is logically partitioned as primary cache and used for read/write request from host and another section for use in mirroring data stored in RDAC 118.2*; col. 7, lines 57-66]; a second NSC including a processor and associated non-volatile memory divided into a primary memory segment and a mirror memory segment [*RDAC 118.2 includes CPU 112.2, local memory 116.2; half of disk drives 110 are used to store and retrieve data while the other half mirror the data storage contents of the first half*, Fig. 1A, col. 5, lines 14-64; *memory 116.2 is logically partitioned as primary cache and used for read/write request from host and another section for use in mirroring data stored in RDAC 118.1*; Fig. 1A, col. 7, line 66- col. 8, line 7]; at least one FCAL connected to the first NSC and the second NSC [*interface bus 150 between RDACs 118.1 and 118.2 may be Fiber Channel*; Fig. 1A, col. 5, lines 24-28]; a plurality of storage devices connected to the FCAL [*interface bus 150*

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*between RDACs 118.1 and 118.2 and disk array 108 (comprises a plurality of disk drives 110) may be Fiber Channel; Fig. 1A, col. 5, lines 22-28]; a point-to-point communication link between the first NSC and the second NSC [shared bus 156; Fig. 1A, col. 6, lines 57-59]; wherein the primary memory in the first NSC and the mirror memory in the second NSC are allocated in corresponding blocks [secondary cache area is assigned corresponding memory addresses in primary cache area; col. 8, lines 7-9; spare controller 118.2 allocates space for the image of the native controller 118.1; col. 9, lines 7-19].*

As per claim 2, DeKoning discloses the primary memory in the second NSC and the mirror memory in the first NSC are allocated in corresponding blocks [col. 8, lines 7-9].

As per claim 3, DeKoning discloses command-response data is transmitted between the first NSC and the second NSC in one or more named resources [col. 5, lines 62-64; col. 6, lines 54-59].

As per claim 4, DeKoning discloses data transmitted as a result of a write I/O operation directed by the first NSC is mirrored in the mirror memory of the second NSC [col. 8, lines 2-4].

As per claim 5, DeKoning discloses data transmitted as a result of a write I/O operation directed by the second NSC is mirrored in the mirror memory of the first NSC [col. 8, lines 4-7].

As per claim 13, DeKoning discloses during a data transfer from the first NSC to the second NSC, the first NSC is configured to identify a memory buffer in the second



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NSC into which data is to be received by the second NSC [*native controller frees the buffers in its RPA memory, note that the native and spare controllers are identical*; col. 9, lines 33-35].

As per claim 14, DeKoning discloses during a data transfer from the first NSC to the second NSC, the second NSC is configured to implement an atomic write of data received from the first NSC [*software and configuration parameters are stored in statically or dynamically allocated portion*; col. 3, lines 20-31].

As per claim 15, DeKoning discloses during a data transfer from the second NSC to the first NSC, the second NSC is configured to identify a memory buffer in the first NSC into each data is to be received by the second NSC [*native controller frees the buffers in its RPA memory, note that the native and spare controllers are identical*; col. 9, lines 33-35].

As per claim 16, DeKoning discloses during a data transfer from the second NSC to the first NSC, the first NSC is configured to implement an atomic write of data received from the second NSC [*software and configuration parameters are stored in statically or dynamically allocated portion*; col. 3, lines 20-31].

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9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 7-10 are rejected under 35 U.S.C. 102(e) as being anticipated by McKean et al. (US6,681,339).

As per claim 7, McKean discloses a method of operating a data storage system, comprising: receiving an I/O request at a primary NSC [*controller A 116 receives a write data request from the host system 102*; Fig. 1, col. 4, lines 27-29]; allocating a block of cache memory in the primary NSC [*primary controller 116 caches the data in cache memory 120*; col. 4, lines 31-32]; receiving data for a write operation in the primary NSC [*write data request includes data to be written by the primary controller 116*; col. 4, lines 29-30]; and transmitting the data to a corresponding block of cache memory in a mirror NSC [*primary controller mirrors the data to controller B*; col. 4, lines 34-38].

As per claim 8, McKean discloses the step of receiving an I/O request at a primary NSC comprises receiving a write I/O request from a host computer [*controller A 116 receives a write data request from the host system 102*; Fig. 1, col. 4, lines 27-29].

As per claim 9, McKean discloses the step of allocating a block of cache memory in the primary NSC automatically allocates a corresponding block of cache memory in the mirror NSC [col. 4, lines 34-38].

As per claim 10, McKean discloses the step of transmitting the data to a corresponding block of cache memory in a mirror NSC implements an atomic write process [col. 4, lines 47-49].

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over McKean et al. (US6,681,339) and Ofek (US6,385,706).

As per claim 11, McKean discloses the claimed invention as detailed above in the previous paragraphs. However, McKean does not specifically teach the step of transmitting the data to a corresponding block of cache memory in a mirror NSC includes transmitting context information with the data as recited in the claim.

Ofek discloses metadata associated with a backup segment to provide sufficient information to determine the characteristics of storage required (col. 23, lines 12-35).

Since the technology for implementing transmitting the data to a corresponding block of cache memory in a mirror NSC includes transmitting context information with the data was well known as evidenced by Ofek, an artisan would have been motivated to implement this feature in the system of McKean. Thus, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the system of McKean to include transmitting the data to a corresponding block of cache memory in a mirror NSC includes transmitting context information with the data because it was well known to provide sufficient information to determine the characteristics of storage required (col. 23, lines 12-35) as taught by Ofek.

13. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKean et al. (US6,681,339) and Dekoning (US6,085,333)

As per claim 17, McKean discloses the claimed invention as detailed above in the previous paragraphs. However, McKean does not specifically teach transmitting the data to a corresponding block of cache memory in a mirror NSC comprises identifying a memory buffer in the mirror NSC into which data is to be received by the mirror NSC as recited in the claim.

DeKoning discloses transmitting the data to a corresponding block of cache memory in a mirror NSC comprises identifying a memory buffer in the mirror NSC into which data is to be received by the mirror NSC [*native controller frees the buffers in its RPA*

*memory, note that the native and spare controllers are identical*; col. 9, lines 33-35] to provide communication and coordination for the transfer of data (col. 9, lines 15-18). Since the technology for implementing transmitting the data to a corresponding block of cache memory in a mirror NSC comprises identifying a memory buffer in the mirror NSC into which data is to be received by the mirror NSC was well known as evidenced by Dekoning, an artisan would have been motivated to implement this feature in the system of McKean. Thus, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to modify the system of McKean to include transmitting the data to a corresponding block of cache memory in a mirror NSC comprises identifying a memory buffer in the mirror NSC into which data is to be received by the mirror NSC because it was well known to provide communication and coordination for the transfer of data (col. 9, lines 15-18) as taught by Dekoning.

As per claim 18, McKean discloses the claimed invention as detailed above in the previous paragraphs. However, McKean does not specifically teach implementing an atomic write function to write the data into a memory block as recited in the claim.

DeKoning discloses implementing an atomic write function to write the data into a memory block [*software and configuration parameters are stored in statically or dynamically allocated portion*; col. 3, lines 20-31] to provide communication and coordination for the transfer of data (col. 9, lines 15-18). Since the technology for implementing an atomic write function to write the data into a memory block was well known as evidenced by Dekoning, an artisan would have been motivated to implement this feature in the

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system of McKean. Thus, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to modify the system of McKean to include implementing an atomic write function to write the data into a memory block because it was well known to provide communication and coordination for the transfer of data (col. 9, lines 15-18) as taught by Dekoning.

14. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning et al (US6,085,333) and IBM Technical Disclosure Bulletin (IBM TDB) (Commands Used to Tunnel Non-SCSI Transactions to a Fibre Channel Attached Controller, February 2000).

As per claim 12, DeKoning discloses the claimed invention as detailed above in the previous paragraphs. However, Dekoning does not specifically teach using SCSI tunneling techniques as recited in the claim.

IBM TDB discloses the use of storage tunneling to facilitate data sharing over geographically distributed enterprises. Since the technology for implementing storage tunneling was well known as evidenced by IBM TDB, an artisan would have been motivated to implement this feature in the system of Dekoning. Thus, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to modify the system of Dekoning to include the use of SCSI tunneling techniques because it was well known to facilitate data sharing over geographically distributed enterprises (Par. 1-2) as taught by IBM TDB.

***Allowable Subject Matter***

15. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

As per claim 6, the prior art of record does not teach or suggest “the NSCs reserve positions for command-response data in the data flow on the point-to-point communication” in combination with the other elements set forth in the claimed invention.

***Conclusion***

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre M. Vital whose telephone number is (571) 272-4215. The examiner can normally be reached on 8:30 am - 6:00 pm, alternate Fridays off.

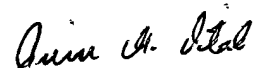
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 16, 2005



Pierre M. Vital  
Primary Examiner  
Art Unit 2188